# MEMORANDUM

Date: June 16, 2008

To: Al Taylor, Michigan Department of Environmental Quality

From: Todd Konechne, The Dow Chemical Company.

RE: In-channel Sediment Stability Assessment Work
Tittabawassee River, Michigan

The purpose of this memo is to provide the Michigan Department of Environmental Quality (MDEQ) with an update on the various phases of work underway in support of the stability assessment of buried in-channel deposits with elevated concentrations of furans and dioxins. In particular, this memo was written to provide an update on the tasks that were reviewed with MDEQ during a teleconference on Thursday, June 12, 2008. Further information on the 2008 plan and field work for assessing channel stability is included in the Working Draft 2008 *GeoMorph*® Sampling and Analysis Plan (2008 SAP) provided to MDEQ on May 19, 2008. The following provides our responses to topics raised by the MDEQ related to in-channel deposits.

*Characterization of in-channel deposits for potential constituents of interest (PCOI)*

The details of the secondary COI process and rationale for selection of sampling locations is described in detail in Section 4.7 of the *GeoMorph*® Site Characterization Report March 2008 Update, dated March 1, 2008 (March 1 Report). Also included in the March 1 Report is the 2006 and 2007 secondary COI data summary report for in-channel and overbank locations. A consolidated 2006/07 secondary COI data summary for in-channel sampling locations is provided in Attachment A of this memo. This summary provides secondary COI data for all 2006/07 in-channel locations and includes; 27 samples collected from 8 Reach J and L locations.

*Field characterization of in-channel sediment stability in the Tittabawassee River*

In-channel sediment stability assessments are ongoing and include bedload/washload measurements, high resolution multibeam bathymetry, and scour chains/erosion pin measurements. An outline of the bedload/washload sampling plan for the Tittabawassee River was provided to MDEQ on May 29, 2008 and reviewed with MDEQ on June 6, 2008. This information is being gathered in support of an overall watershed assessment of channel stability and sediment supply for the Tittabawassee River which is outlined in Section 3.5 of the 2008 *GeoMorph*® SAP for the Tittabawassee River.

Detailed multibeam bathymetric surveys were performed in April 2008 Reaches A-B and E-YY to provided further information on in-channel morphology and sediment depositional processes. The integration of multibeam sonar with precision GPS-based positioning provided high

resolution positioning and elevation data, along with vessel heading and altitude, resulted in superior results for high resolution bathymetric mapping. The 2008 bathymetric survey charts were included in the 2008 SAP provided to MDEQ on May 19, 2008.

During the fall of 2007 a network of in-channel scour chains/erosion pins were installed in the Upper Reach L deposit to evaluate various scour chain/erosion pin configurations and installation techniques that are best suited for conditions along the Tittabawassee River and begin measuring sediment bed elevations. In-channel scour chain/erosion pin transects were installed in the fall 2008 at the following transects in the upper Tittabawassee River:

RL-235+50, RL-236+50, RL-237+50, RL-238+50, RL-239+00, RL-239+50

A post high flow scour chain/erosion pins and bed elevation survey will be performed at these transects during the summer of 2008 when low flows return to the Tittabawassee River. In addition, in-channel scour chain/erosion pin transects are planned to be installed during the summer of 2008 when low flows return to the Tittabawassee River at the following transects:

<u>Upper Tittabawassee</u>

RI-164+50, RI-166+00, RJ-189+50, RJ-191+00, RJ-193+50, RJ-194+50, RJ-195+50, RK-198+50, RK-199+50, RL-256+00, RL-257+00, RL-257+50, RL-258+50, RL-259+50, RL-261+00, RL-261+50, RM-271+50, RM-273+00, RM-274+75, RN-315+75, RN-318+00

<u>Middle Tittabawassee</u>

RQ-359+00, RQ-359+50, RQ-364+75, RQ-365+50, RQ-367+00, RR-368+50, RR-390+00, RS-416+00, RS-417+00, RS-418+75, RS-422+00, RS-422+75, RS-426+00, RS-428+00, RT-432+75, RS-434+00, RS-435+00, RT-438+00, RT-439+00, RU-440+25, RU-455+50, RU-458+50, RU-475+25

Maximum predicted velocities and shear stress were modeled for the 3-year storm event and presented with the September 25, 2007 assessment of Reach L Sediment Stability. Work is ongoing to improve our numerical and physical modeling evaluations including: determination of geomorphologic bankfull discharge (vs. top of bank discharge), effects of secondary circulation, modeling the effects of secondary circulation, evaluation of curvilinear and boundary fitted gridding, and using vegetation resistance factors for typical/nonflood flow through high flood flow conditions.

During the winter of 2007/08 an initial observation of potential ice damming effects was photo documented at locations along the Tittabawassee River. Photo documentation and associated weather and river flow conditions were collected routinely throughout the 2007/2008 winter season to identify locations for further evaluation of the potential effects associated with ice flow and damming. This initial phase of data was gathered in support of an overall assessment of potential ice effects associated with channel stability and sediment supply for the Tittabawassee River which is outlined in Section 3.5 of the 2008 *GeoMorph*® SAP for the Tittabawassee River.

*Scheduling*

By June 30, 2008, Dow will communicate a schedule for this work to the MDEQ.

## REFERENCES


Ann Arbor Technical Services, Inc., *"GeoMorph® Site Characterization Report March 2008 Update:" Tittabawassee River and Floodplain Soils, Midland, Michigan,"* March 1, 2008.

Ann Arbor Technical Services, Inc., *"Working Draft 2008 GeoMorph® Sampling and Analysis Plan": Tittabawassee River, Midland, Michigan,"* May 19, 2008.

**Attachment A**

**2006 and 2007 Secondary COI Data Summary**
**In-Channel Sampling Location**

**Tittabawassee River, Midland Michigan**